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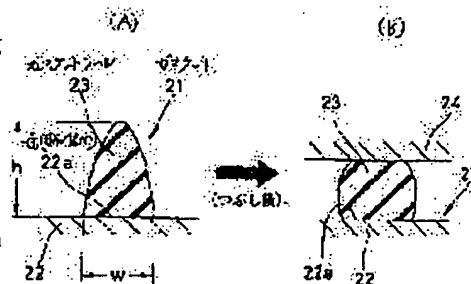
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## (54) GASKET AND ITS MANUFACTURING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a gasket and its manufacturing method using a dispenser system capable of setting small the bottom edge member of a gasket seal even in the case the height to the mating member is large, securing wide the position where the seal can be molded, suppressing the amount used of the seal molding material, suppressing small the gasket reaction force, and also suppressing dispersion of the gasket reaction force largely according to the position.

SOLUTION: According to the manufacturing method for a gasket 21, a gasket seal material is applied to the object surface 22a using a dispenser system fitted with a needle, whereby the opening shape of the discharge port in the needle is given an irregularly shaped section so that the section shape of a gasket seal 23 after molding is made  $h/w \geq 1$ , where (h) is the height of the section and (w) is the maximum width.



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CLAIMS

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[Claim(s)]

[Claim 1] It is the approach of manufacturing a gasket (21) by applying a gasket seal molding material (23') to the field for spreading (22a) using the dispenser system (1) equipped with the needle (2). The manufacture approach of the gasket characterized by setting the cross-section configuration of the gasket seal after shaping (23) to  $h/w \geq 1$  by making the opening configuration of the delivery (2b) of said needle (2) into a variant cross section, using the maximum width as w using the height as h.

[Claim 2] The manufacture approach of the gasket characterized by using what set the angle of sweepback ( $\alpha$ ) as the needle (2) in the manufacture approach of the gasket of claim 1.

[Claim 3] The manufacture approach of the gasket characterized by using what carries out rotation actuation a core [ the medial axis (0) ] in the manufacture approach of the gasket of claims 1 or 2 while moving in a parallel direction and the direction of a right angle to the field for spreading (22a) at a needle (2).

[Claim 4] The gasket which is a gasket (21) manufactured by applying a gasket seal molding material (23') to the field for spreading (22a) using the dispenser system (1) equipped with the needle (2), and is characterized by setting the cross-section configuration of the gasket seal after shaping (23) to  $h/w \geq 1$ , having used the maximum width as w having used the height as h.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the gasket which is a kind of a sealing device, and relates to the gasket especially manufactured using a dispenser system, and its manufacture approach.

[0002]

[Description of the Prior Art] Although it has been thought till today that the gasket manufactured by the dispenser system is generally a simple gasket, it is observed from that the manufacture is easy and a manufacturing cost being cheap, and, recently, the interest has been increasing with expansion of a function.

[0003] Here, if the outline structure of the gasket 51 manufactured by this dispenser system is shown in drawing 18 (A) as a conventional example, by applying a liquefied gasket seal molding material to whole surface 52a of the gasket substrate 52 as a field for spreading, the gasket 51 is fabricated and let the cross-section configuration of the gasket seal 53 after shaping be an abbreviation hemicycle.

[0004] Moreover, as the needle 56 in the conventional dispenser system 55 is shown in drawing 19 (A) and (B), the tip opening configuration is circular and the point is made straight [ angle-of-sweepback zero ], and as the control direction of the dispenser system 55, i.e., the actuation direction of a needle 56, is shown in drawing 20, it considers only as the parallel direction to field 22 for spreading a, and the direction of a right angle (X-Y-Z direction).

[0005] However, it sets to the gasket 51 manufactured by this conventional dispenser system 55. Since it becomes what the cross-section configuration of the gasket seal 53 after shaping set the height to h, set the maximum width to w, and was limited to  $h/w < 1$ , considering the above-mentioned tip opening configuration of a needle 56 etc. \*\* From the die length of the base of the gasket seal 53 becoming long, and the width of face becoming large, when the height to partner material is comparatively high If the height is made high in order to raise the endurance of the \*\* gasket seal 53 with which the amount of the molding material which constraint arises in the location of the gasket seal 53 which can be fabricated, and is needed for shaping of the gasket seal 53 increases On the occasion of the nest of a gasket 51, gasket reaction force becomes high in first stage. Depending on the case In the part in which the flat-surface configuration of the \*\* gasket seal 53 which may deform the gasket substrate 52 according to the gasket reaction force which became high too much is curved or crooked, since die length differs by the inner circumference and periphery side As an approach of a cross-section configuration tending to become distorted, and there being un-arranging [ which said that the magnitude of gasket reaction force would change with flat-surface locations as the result ], and avoiding these un-arranging \*\* Although the approach referred to as using a dispenser, fabricating foundation 53a to the 1st time, and fabricating up 53b to the 2nd time, namely, performing coating twice can be considered as shown in \*\* drawing 18 (B) which fabricates the gasket seal 53 by options, such as injection molding Neither of the approaches can start cost and the demand function in recent years cannot fully be satisfied.

[0006] It is related with the tip configuration of a needle until now. Moreover, besides a circular

cross section and a straight nozzle Although what made the needle bore tapering off (refer to JP,62-258776,A or JP,9-239976,A), the thing (refer to JP,7-318747,A) which prepared the include angle at the tip of a needle are developed In case these conventional techniques carry out dispenser spreading of the liquid (3 - 300cpoise) of hypoviscosity comparatively, they are proposed for plugging prevention of a needle, or stabilization of coverage, and they do not set the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$  like this invention. [0007]

[Problem(s) to be Solved by the Invention] In the approach of manufacturing a gasket in view of the point of a more than [ this invention ] using a dispenser system Even if it is the case that the height to partner material is comparatively high, while it is possible to be able to set up the base of a gasket seal comparatively small, to have it, and to secure widely the location of a gasket seal which can be fabricated The manufacture approach [ it is possible to stop the amount of the gasket seal molding material used few, and it is possible to suppress gasket reaction force small, and ] of a gasket which can stop that gasket reaction force varies greatly with a location further, It aims at offering the gasket manufactured by this approach. [0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the manufacture approach of the gasket by claim 1 of this invention By being the approach of manufacturing a gasket by applying a gasket seal molding material to the field for spreading using the dispenser system equipped with the needle, and making the opening configuration of the delivery of said needle into a variant cross section It is characterized by setting the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$ , using the maximum width as w using the height as h.

[0009] Moreover, the manufacture approach of the gasket by claim 2 of this invention is characterized by using what set the angle of sweepback as the needle in the manufacture approach of the above-mentioned gasket of claim 1.

[0010] Moreover, in the manufacture approach of the above-mentioned gasket of claims 1 or 2, the manufacture approach of the gasket by claim 3 of this invention is characterized by using what carries out rotation actuation a core [ the medial axis ] while it moves in a parallel direction and the direction of a right angle to the field for spreading at a needle.

[0011] Moreover, the gasket by claim 4 of this invention It is the gasket manufactured by applying a gasket seal molding material to the field for spreading using the dispenser system equipped with the needle. It is characterized by setting the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$ , having used that maximum width as w having used that height as h, and the manufacture approach of above-mentioned claim 1 thru/or each item of 3 is invented that the gasket of this claim 4 should be manufactured.

[0012]

[Embodiment of the Invention] The example of this invention is explained below.

[0013] A thing is [ making the manufacture approach of a gasket, and the dispenser structure of a system with which the operation is presented be the following ] suitable in order to solve the trouble in the above-mentioned conventional technique.

[0014] The first example ... Namely, first, as shown in the first place at drawing 1 (A) and (B) The tip configuration of the needle 2 in the dispenser system 1 is made into a variant cross section. The cross-section configuration of the gasket seal 23 which applies to whole surface 22a of the gasket substrate 22 as a field for spreading, and it is made to harden using the needle 2 of this variant cross section is made to be set to  $h/w \geq 1$  as shown in drawing 2 (A), using that maximum width as w using that height as h.

[0015] It says that a variant cross section does not have a circular cross-section configuration, and it is [ ellipse / (or configuration of one of the two which halved the ellipse to the longitudinal direction) / a triangle, a square, a trapezoid, an ellipse form (or configuration of one of the two which halved the ellipse form to the longitudinal direction), or ] un-circular. making the tip configuration of a needle 2 into a variant cross section it says supposing that it is un-circular (it had the longitudinal direction -- un-circular), without making circular the tip opening configuration of a needle 2, i.e., the opening configuration of delivery 2b in apical surface 2a of a

needle 2, (inner hull configuration of apical surface 2a) also including the outline configuration of apical surface 2a, when required.

[0016] In the illustrated example, as shown in drawing 1 (B), the opening configuration of delivery 2b in apical surface 2a of a needle 2 It considers as the configuration (outline isosceles triangle) which combined the trapezoid and triangle from which the ratio of height  $h'$  to die-length  $w'$  of the base is set to about 1.5. Although it changes somewhat with the quality of the materials or the degrees of hardness of the gasket seal 23 to apply, as shown in drawing 2 (A) The cross-section configuration of the gasket seal 23 before attachment by the partner material 24 similarly It considers as the configuration which combined the trapezoid and triangle from which the ratio of height  $h$  to die-length  $w$  of the base is set to about 1.5. As shown in drawing 2 (B), when making it the ratio of the height to the die length of the base set to about 1-1.2, the cross-section configuration of the gasket seal 23 after assembly with the partner material 24 (after crushing) The seal nature stabilized in the range of relative pressure 0-0.5MPa is securable.

[0017] Moreover, since it is possible to set up the base of the gasket seal 23 comparatively small even if it is the case that the height to the \*\* partner material 24 is comparatively high, by making the tip configuration of a needle 2 into a variant cross section in this way The location of the gasket seal 23 which can be fabricated can be secured widely, and the degree of freedom of the layout of the gasket seal 23 can be extended. Moreover, as the amount of the molding material of the gasket seal 23 to be used is shown in the graphical representation of \*\* drawing 3 which can be stopped few Since it becomes smaller than the case where the augend of gasket reaction force to the amount of gasket seal crushing is the conventional technique Since it is possible to set up widely the height tolerance of the \*\* gasket seal 23 which can prevent that the gasket substrate 22 deforms according to gasket reaction force, and clearance tolerance with the partner material 24 after crushing The gasket 21 equipped with the cross-section configuration which does so the operation effectiveness which said that the stable seal engine performance was securable, and does such operation effectiveness so can be obtained by once coating of liquefied gasket seal molding material 23'.

[0018] In addition, the configuration of the needle 2 concerning this example makes the opening configuration of delivery 2b a variant cross section, making apical surface 2a of a needle 2 into a flat side without preparing a notch in point 2c of a needle 2.

[0019] Moreover, the second [ to the trouble in the above-mentioned conventional technique ] solution means gives the angle of sweepback  $\alpha$  of predetermined magnitude to point 2c of the needle 2 in the dispenser system 1, as shown in drawing 1 (A).

[0020] And if the angle of sweepback  $\alpha$  of a predetermined include angle is given to point 2c of a needle 2 in this way, this is enabled to use effectively the shape of needle dimorphism shown with the above-mentioned first solution means, as the result, it is stabilized and the gasket seal 23 of a variant cross section can be fabricated.

[0021] Moreover, not only making it move in a parallel direction and the direction of a right angle (X-Y-Z direction) but the third [ to the trouble in the above-mentioned conventional technique ] solution means enables rotation actuation of a needle 2 in the direction of  $\theta$  focusing on the medial axis line 0 to whole surface 22a of the gasket substrate 22 which is a field for spreading, as show in drawing 4 .

[0022] And in this way, if not only make it move in a parallel direction and the direction of a right angle but rotation actuation of a needle 2 be enable focusing on the medial axis line 0 to whole surface 22a of the gasket substrate 22, it become possible to use effectively the shape of needle dimorphism showed with the above-mentioned first solution means, and as the result, it be stabilize and the gasket seal 23 of a variant cross section can be fabricate. That is, in the flat-surface layout of the gasket seal 23, although a cross-section configuration tends to become distorted in the curve and flecion since die length differs on the inner circumference and the periphery of a rubber seal, according to this invention, generating of configuration unevenness can be suppressed rather than the case of the conventional technique, and it can stop that gasket reaction force varies with a location by this.

[0023] In addition, in order to carry out rotation actuation of the needle 2 a core [ the medial-

axis line 0 ], the running torque of rotation driving sources, such as a motor, is transmitted to a needle 2 through torque means of communication, such as a belt.

[0024] Moreover, you may make it control of each X [ these ], Y and Z, and the direction of theta move both to relativity by moving both, respectively that what is necessary is just to move both to relativity by moving either the table (not shown) which carried the gasket substrate 22 which is a field for spreading or the needles 2.

[0025] Moreover, in the example concerned, although the viscosity of a gasket sealing material assumes about 2000 to 50000 poise, the range may be like 500 – 50000poise.

[0026] The second example ... the fourth [ to the trouble in the above-mentioned conventional technique ] solution means As shown in drawing 5 (A), (B), and (C), the opening configuration of delivery 2b of a needle 2 is made into a variant cross section by forming a notch 3 in point 2c of the needle 2 in the dispenser system 1. The cross-section configuration of the gasket seal 23 which applies to whole surface 22a of the gasket substrate 22 as a field for spreading, and it is made to harden using the needle 2 equipped with delivery 2b of this variant cross section is made to be set to  $h/w \geq 1$  as shown in drawing 6 , using that maximum width as w using that height as h.

[0027] As opposed to the needle 2 of the shape of a cylindrical shape whose d is the inside diameter of  $\phi 1.45\text{mm}$  in the illustrated example By being prepared so that the notch 3 whose width of face w1 is 1.34mm and whose height h1 is 2.9mm may leave a part of apical surface 2a of an axial right angle and may cut point 2b aslant, and forming such a notch 3 By accommodation of the coating pressure force, the rest (after) can manufacture the gasket 1 with which are satisfied of  $h/w \geq 1$ . And by forming a notch 3 in point 2b of a needle 2, and making the tip opening configuration of a needle 2 into a variant cross section in this way \*\* Since it is possible to set up the base of the gasket seal 23 comparatively small even if it is the case that the height to partner material (not shown) is comparatively high The location of the gasket seal 23 which can be fabricated can be secured widely, and the degree of freedom of the layout of the gasket seal 23 can be extended. Moreover, as the amount of the molding material of the gasket seal 23 to be used is shown in the graphical representation of \*\* drawing 7 which can be stopped few Since it becomes smaller than the case where the augend of gasket reaction force to the amount of gasket seal crushing is the conventional technique Since it is possible to set up widely the height tolerance of the \*\* gasket seal 23 which can prevent that the gasket substrate 22 deforms according to gasket reaction force, and clearance tolerance with the partner material 24 after crushing The gasket 21 equipped with the cross-section configuration which does so the operation effectiveness which said that the stable seal engine performance was securable, and does such operation effectiveness so can be obtained by once coating of liquefied gasket seal molding material 23'.

[0028] In addition, the notching configuration at needle 2 illustrated tip is an example, and is suitably set up according to the spreading conditions of the configuration and needle 2 bore, and coating pressure force of an aim after the ingredient to apply and spreading.

[0029] Moreover, not only making it move in a parallel direction and the direction of a right angle (X-Y-Z direction) but the fifth [ to the trouble in the above-mentioned conventional technique ] solution means enables rotation actuation of a needle 2 in the direction of theta focusing on the medial axis line 0 to whole surface 22a of the gasket substrate 22 which is a field for spreading, as show in drawing 8 .

[0030] And in this way, if not only make it move in a parallel direction and the direction of a right angle but rotation actuation of a needle 2 be enable focusing on the medial axis line 0 to whole surface 22a of the gasket substrate 22, it become possible to use effectively the shape of needle dimorphism showed with the above-mentioned fourth solution means, and as the result, it be stabilize and the gasket seal 23 of a variant cross section can be fabricate. That is, in the flat-surface layout of the gasket seal 23, although a cross-section configuration tends to become distorted in the curve and flecion since die length differs on the inner circumference and the periphery of a rubber seal, according to this invention, generating of configuration unevenness can be suppressed rather than the case of the conventional technique, and it can stop that gasket reaction force varies with a location by this.

[0031] Generally, since a dispenser 1 is attached in the Z-axis (namely, theta revolving shaft) through a jig, program amendment of the part which hits the arm is not only needed, but the running torque for weight of a dispenser 1 is needed, and the theta directional-control approach leads to the increment in a motor or power consumption. Even if the Z-axis is pivotable 360 degrees or more, also when a dispenser 1 interferes in a robot's skeleton depending on the jig at this time, and dispenser 1 configuration and it becomes impossible to be rotated only about 180 degrees, there is. Moreover, when a notch 3 is formed at the tip of a needle 2 and a robot is made into six five axis controls like an industrial robot, a robot's cost will double [ about ] to this invention. As shown in drawing 9 or drawing 10, carrying out a deer, the rotational structure of a dispenser 1 By considering as the structure of rotating the needle 2 which attached the dispenser body in the Z-axis stay 4, and was attached in the Z-axis 5 \*\* Compaction of the programming time by simplification of an actuation program, and the improvement in accuracy, \*\* The portable weight increase of the part by the reduction in torque (low-capacity-izing) and miniaturization of a Z-axis actuation motor, \*\* the case where the configuration of the dispenser 1 by the ability to use movable angle of rotation of the Z-axis effectively and reduction of constraint of magnitude, and a \*\* 6 shaft robot are used — comparing — a robot body — cost — about — the effectiveness referred to as being referred to as one half can be acquired.

[0032] Moreover, you may make it control of each X [ these ], Y and Z, and the direction of theta move both to relativity by moving both, respectively that what is necessary is just to move both to relativity by moving either the table (not shown) which carried the gasket substrate 22 which is a field for spreading or the needles 2.

[0033] In addition, in the example concerned, the viscosity of a gasket sealing material assumes about 500 to 50000 poise. As a gasket sealing material, for example, UV polyurethane, the silicone rubber made from Shin-etsu silicone (RTV rubber), silicone adhesives, etc. are suitable.

[0034] Moreover, in this invention, although shown in drawing 2 (A) or drawing 6, others and various things can be considered in the cross-section configuration of the gasket seal 23, for example, the following can be mentioned to it.

[0035] \*\* As shown in drawing 11, let the cross-section configuration of the gasket seal 23 be an abbreviation triangle.

\*\* As shown in drawing 12, let the cross-section configuration of the gasket seal 23 be an abbreviation square.

\*\* As shown in drawing 13, let the cross-section configuration of the gasket seal 23 be the abbreviation square which formed the upper limit section in the hemicycle.

\*\* As shown in drawing 14, make the cross-section configuration of the gasket seal 23 into the abbreviation trapezoid which has arranged the long side in the lower limit section.

\*\* As shown in drawing 15, make the cross-section configuration of the gasket seal 23 into the abbreviation trapezoid which has arranged the long side in the upper limit section.

\*\* As shown in drawing 16, make the cross-section configuration of the gasket seal 23 into an abbreviation pentagon.

\*\* As shown in drawing 17, make the cross-section configuration of the gasket seal 23 into the abbreviation ellipse form which cut the lower limit section flat.

[0036] Although, as for the cross-section configuration of \*\* thru/or \*\*, the maximum width w is set as that lower limit section among the cross-section configurations of this \*\* thru/or \*\*, the maximum width w will be set as parts other than the lower limit section which the cross-section configuration of \*\* thru/or \*\* equipped with the predetermined width of face w1.

[0037]

[Effect of the Invention] This invention does the following effectiveness so.

[0038] Namely, it sets to the manufacture approach of the gasket by claim 1 of this invention equipped with the above-mentioned configuration. By setting the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$  by making the opening configuration of the delivery of a needle into a variant cross section, using the maximum width as w using the height as h Since it is possible to set up the base of a gasket seal comparatively small even if it is the case that the height to the partner material of a gasket seal is comparatively high The amount of the gasket sealing material which can secure widely the location of a gasket seal which can be fabricated,



and can extend the degree of freedom of the layout of a gasket seal, and is used can be stopped few. Moreover, since it is possible to make augend of gasket reaction force to the amount of gasket seal crushing smaller than before, it can prevent that a gasket substrate etc. deforms according to gasket reaction force. Moreover, since it is possible to set up widely the height tolerance of a gasket seal and clearance tolerance with the partner material after crushing, the stable seal engine performance is securable.

[0039] In addition to this, by setting the angle of sweepback of a predetermined include angle as a needle in the manufacture approach of the gasket by claim 2 of this invention equipped with the above-mentioned configuration, the needle in above-mentioned claim 1 can be used effectively, as the result, it is stabilized and the gasket seal of a variant cross section can be supplied again.

[0040] Moreover, in the manufacture approach of the gasket by claim 3 of this invention equipped with the above-mentioned configuration, not only by making it move in a parallel direction and the direction of a right angle but by carrying out rotation actuation of the needle a core [ the medial-axis line ] to the field for spreading, the needle in above-mentioned claims 1 or 2 can be used effectively, as the result, it is stabilized and the gasket seal of a variant cross section can be supplied.

[0041] Furthermore, the gasket which has the operation effectiveness in each above-mentioned claim in the gasket by claim 4 of this invention equipped with the above-mentioned configuration, i.e., reaction force, is comparatively small, there is little dispersion in reaction force, and the gasket product excellent in endurance and seal nature can be offered again.

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**TECHNICAL FIELD**

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## PRIOR ART

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[Description of the Prior Art] Although it has been thought till today that the gasket manufactured by the dispenser system is generally a simple gasket, it is observed from that the manufacture is easy and a manufacturing cost being cheap, and, recently, the interest has been increasing with expansion of a function.

[0003] Here, if the outline structure of the gasket 51 manufactured by this dispenser system is shown in drawing 18 (A) as a conventional example, by applying a liquefied gasket seal molding material to whole surface 52a of the gasket substrate 52 as a field for spreading, the gasket 51 is fabricated and let the cross-section configuration of the gasket seal 53 after shaping be an abbreviation hemicycle.

[0004] Moreover, as the needle 56 in the conventional dispenser system 55 is shown in drawing 19 (A) and (B), the tip opening configuration is circular and the point is made straight [ angle-of-sweepback zero ], and as the control direction of the dispenser system 55, i.e., the actuation direction of a needle 56, is shown in drawing 20, it considers only as the parallel direction to field 22 for spreading a, and the direction of a right angle (X-Y-Z direction).

[0005] However, it sets to the gasket 51 manufactured by this conventional dispenser system 55. Since it becomes what the cross-section configuration of the gasket seal 53 after shaping set the height to h, set the maximum width to w, and was limited to  $h/w < 1$ , considering the above-mentioned tip opening configuration of a needle 56 etc. \*\* From the die length of the base of the gasket seal 53 becoming long, and the width of face becoming large, when the height to partner material is comparatively high If the height is made high in order to raise the endurance of the \*\* gasket seal 53 with which the amount of the molding material which constraint arises in the location of the gasket seal 53 which can be fabricated, and is needed for shaping of the gasket seal 53 increases On the occasion of the nest of a gasket 51, gasket reaction force becomes high in first stage. Depending on the case In the part in which the flat-surface configuration of the \*\* gasket seal 53 which may deform the gasket substrate 52 according to the gasket reaction force which became high too much is curved or crooked, since die length differs by the inner circumference and periphery side As an approach of a cross-section configuration tending to become distorted, and there being un-arranging [ which said that the magnitude of gasket reaction force would change with flat-surface locations as the result ], and avoiding these un-arranging \*\* Although the approach referred to as using a dispenser, fabricating foundation 53a to the 1st time, and fabricating up 53b to the 2nd time, namely, performing coating twice can be considered as shown in \*\* drawing 18 (B) which fabricates the gasket seal 53 by options, such as injection molding Neither of the approaches can start cost and the demand function in recent years cannot fully be satisfied.

[0006] It is related with the tip configuration of a needle until now. Moreover, besides a circular cross section and a straight nozzle Although what made the needle bore tapering off (refer to JP,62-258776,A or JP,9-239976,A), the thing (refer to JP,7-318747,A) which prepared the include angle at the tip of a needle are developed In case these conventional techniques carry out dispenser spreading of the liquid (3 - 300cpoise) of hypoviscosity comparatively, they are proposed for plugging prevention of a needle, or stabilization of coverage, and they do not set the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$  like this invention.

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EFFECT OF THE INVENTION

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[Effect of the Invention] This invention does the following effectiveness so.

[0038] That is, it sets to the manufacture approach of the gasket by claim 1 of this invention equipped with the above-mentioned configuration, By setting the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$  by making the opening configuration of the delivery of a needle into a variant cross section, using the maximum width as  $w$  using the height as  $h$  Since it is possible to set up the base of a gasket seal comparatively small even if it is the case that the height to the partner material of a gasket seal is comparatively high The amount of the gasket sealing material which can secure widely the location of a gasket seal which can be fabricated, and can extend the degree of freedom of the layout of a gasket seal, and is used can be stopped few. Moreover, since it is possible to make augend of gasket reaction force to the amount of gasket seal crushing smaller than before, it can prevent that a gasket substrate etc. deforms according to gasket reaction force. Moreover, since it is possible to set up widely the height tolerance of a gasket seal and clearance tolerance with the partner material after crushing, the stable seal engine performance is securable.

[0039] In addition to this, by setting the angle of sweepback of a predetermined include angle as a needle in the manufacture approach of the gasket by claim 2 of this invention equipped with the above-mentioned configuration, the needle in above-mentioned claim 1 can be used effectively, as the result, it is stabilized and the gasket seal of a variant cross section can be supplied again.

[0040] Moreover, in the manufacture approach of the gasket by claim 3 of this invention equipped with the above-mentioned configuration, not only by making it move in a parallel direction and the direction of a right angle but by carrying out rotation actuation of the needle a core [ the medial-axis line ] to the field for spreading, the needle in above-mentioned claims 1 or 2 can be used effectively, as the result, it is stabilized and the gasket seal of a variant cross section can be supplied.

[0041] Furthermore, the gasket which has the operation effectiveness in each above-mentioned claim in the gasket by claim 4 of this invention equipped with the above-mentioned configuration, i.e., reaction force, is comparatively small, there is little dispersion in reaction force, and the gasket product excellent in endurance and seal nature can be offered again.

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[Translation done.]

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] In the approach of manufacturing a gasket in view of the point of a more than [ this invention ] using a dispenser system Even if it is the case that the height to partner material is comparatively high, while it is possible to be able to set up the base of a gasket seal comparatively small, to have it, and to secure widely the location of a gasket seal which can be fabricated The manufacture approach [ it is possible to stop the amount of the gasket seal molding material used few, and it is possible to suppress gasket reaction force small, and ] of a gasket which can stop that gasket reaction force varies greatly with a location further, It aims at offering the gasket manufactured by this approach.

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MEANS

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[Means for Solving the Problem] In order to attain the above-mentioned purpose, the manufacture approach of the gasket by claim 1 of this invention By being the approach of manufacturing a gasket by applying a gasket seal molding material to the field for spreading using the dispenser system equipped with the needle, and making the opening configuration of the delivery of said needle into a variant cross section It is characterized by setting the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$ , using the maximum width as w using the height as h.

[0009] Moreover, the manufacture approach of the gasket by claim 2 of this invention is characterized by using what set the angle of sweepback as the needle in the manufacture approach of the above-mentioned gasket of claim 1.

[0010] Moreover, in the manufacture approach of the above-mentioned gasket of claims 1 or 2, the manufacture approach of the gasket by claim 3 of this invention is characterized by using what carries out rotation actuation a core [ the medial axis ] while it moves in a parallel direction and the direction of a right angle to the field for spreading at a needle.

[0011] Moreover, the gasket by claim 4 of this invention It is the gasket manufactured by applying a gasket seal molding material to the field for spreading using the dispenser system equipped with the needle. It is characterized by setting the cross-section configuration of the gasket seal after shaping to  $h/w \geq 1$ , having used that maximum width as w having used that height as h, and the manufacture approach of above-mentioned claim 1 thru/or each item of 3 is invented that the gasket of this claim 4 should be manufactured.

[0012]

[Embodiment of the Invention] The example of this invention is explained below.

[0013] A thing is [ making the manufacture approach of a gasket, and the dispenser structure of a system with which the operation is presented be the following ] suitable in order to solve the trouble in the above-mentioned conventional technique.

[0014] The first example ... Namely, first, as shown in the first place at drawing 1 (A) and (B) The tip configuration of the needle 2 in the dispenser system 1 is made into a variant cross section. The cross-section configuration of the gasket seal 23 which applies to whole surface 22a of the gasket substrate 22 as a field for spreading, and it is made to harden using the needle 2 of this variant cross section is made to be set to  $h/w \geq 1$  as shown in drawing 2 (A), using that maximum width as w using that height as h.

[0015] It says that a variant cross section does not have a circular cross-section configuration, and it is [ ellipse / (or configuration of one of the two which halved the ellipse to the longitudinal direction) / a triangle, a square, a trapezoid, an ellipse form (or configuration of one of the two which halved the ellipse form to the longitudinal direction), or ] un-circular. making the tip configuration of a needle 2 into a variant cross section it says supposing that it is un-circular (it had the longitudinal direction -- un-circular), without making circular the tip opening configuration of a needle 2, i.e., the opening configuration of delivery 2b in apical surface 2a of a needle 2, (inner hull configuration of apical surface 2a) also including the outline configuration of apical surface 2a, when required.

[0016] In the illustrated example, as shown in drawing 1 (B), the opening configuration of delivery

2b in apical surface 2a of a needle 2 It considers as the configuration (outline isosceles triangle) which combined the trapezoid and triangle from which the ratio of height  $h'$  to die-length  $w'$  of the base is set to about 1.5. Although it changes somewhat with the quality of the materials or the degrees of hardness of the gasket seal 23 to apply, as shown in drawing 2 (A) The cross-section configuration of the gasket seal 23 before attachment by the partner material 24 similarly It considers as the configuration which combined the trapezoid and triangle from which the ratio of height  $h$  to die-length  $w$  of the base is set to about 1.5. As shown in drawing 2 (B), when making it the ratio of the height to the die length of the base set to about 1-1.2, the cross-section configuration of the gasket seal 23 after assembly with the partner material 24 (after crushing) The seal nature stabilized in the range of relative pressure 0-0.5MPa is securable.

[0017] Moreover, since it is possible to set up the base of the gasket seal 23 comparatively small even if it is the case that the height to the \*\* partner material 24 is comparatively high, by making the tip configuration of a needle 2 into a variant cross section in this way The location of the gasket seal 23 which can be fabricated can be secured widely, and the degree of freedom of the layout of the gasket seal 23 can be extended. Moreover, as the amount of the molding material of the gasket seal 23 to be used is shown in the graphical representation of \*\* drawing 3 which can be stopped few Since it becomes smaller than the case where the augend of gasket reaction force to the amount of gasket seal crushing is the conventional technique Since it is possible to set up widely the height tolerance of the \*\* gasket seal 23 which can prevent that the gasket substrate 22 deforms according to gasket reaction force, and clearance tolerance with the partner material 24 after crushing The gasket 21 equipped with the cross-section configuration which does so the operation effectiveness which said that the stable seal engine performance was securable, and does such operation effectiveness so can be obtained by once coating of liquefied gasket seal molding material 23'.

[0018] In addition, the configuration of the needle 2 concerning this example makes the opening configuration of delivery 2b a variant cross section, making apical surface 2a of a needle 2 into a flat side without preparing a notch in point 2c of a needle 2.

[0019] Moreover, the second [ to the trouble in the above-mentioned conventional technique ] solution means gives the angle of sweepback  $\alpha$  of predetermined magnitude to point 2c of the needle 2 in the dispenser system 1, as shown in drawing 1 (A).

[0020] And if the angle of sweepback  $\alpha$  of a predetermined include angle is given to point 2c of a needle 2 in this way, this is enabled to use effectively the shape of needle dimorphism shown with the above-mentioned first solution means, as the result, it is stabilized and the gasket seal 23 of a variant cross section can be fabricated.

[0021] Moreover, not only making it move in a parallel direction and the direction of a right angle (X-Y-Z direction) but the third [ to the trouble in the above-mentioned conventional technique ] solution means enables rotation actuation of a needle 2 in the direction of  $\theta$  focusing on the medial axis line 0 to whole surface 22a of the gasket substrate 22 which is a field for spreading, as show in drawing 4 .

[0022] And in this way, if not only make it move in a parallel direction and the direction of a right angle but rotation actuation of a needle 2 be enable focusing on the medial axis line 0 to whole surface 22a of the gasket substrate 22, it become possible to use effectively the shape of needle dimorphism showed with the above-mentioned first solution means, and as the result, it be stabilize and the gasket seal 23 of a variant cross section can be fabricate. That is, in the flat-surface layout of the gasket seal 23, although a cross-section configuration tends to become distorted in the curve and flecion since die length differs on the inner circumference and the periphery of a rubber seal, according to this invention, generating of configuration unevenness can be suppressed rather than the case of the conventional technique, and it can stop that gasket reaction force varies with a location by this.

[0023] In addition, in order to carry out rotation actuation of the needle 2 a core [ the medial-axis line 0 ], the running torque of rotation driving sources, such as a motor, is transmitted to a needle 2 through torque means of communication, such as a belt.

[0024] Moreover, you may make it control of each X [ these ], Y and Z, and the direction of



theta move both to relativity by moving both, respectively that what is necessary is just to move both to relativity by moving either the table (not shown) which carried the gasket substrate 22 which is a field for spreading or the needles 2.

[0025] Moreover, in the example concerned, although the viscosity of a gasket sealing material assumes about 2000 to 50000 poise, the range may be like 500 – 50000 poise.

[0026] The second example ... the fourth [ to the trouble in the above-mentioned conventional technique ] solution means As shown in drawing 5 (A), (B), and (C), the opening configuration of delivery 2b of a needle 2 is made into a variant cross section by forming a notch 3 in point 2c of the needle 2 in the dispenser system 1. The cross-section configuration of the gasket seal 23 which applies to whole surface 22a of the gasket substrate 22 as a field for spreading, and it is made to harden using the needle 2 equipped with delivery 2b of this variant cross section is made to be set to  $h/w \geq 1$  as shown in drawing 6, using that maximum width as w using that height as h.

[0027] As opposed to the needle 2 of the shape of a cylindrical shape whose d is the inside diameter of  $\phi 1.45\text{mm}$  in the illustrated example By being prepared so that the notch 3 whose width of face w1 is 1.34mm and whose height h1 is 2.9mm may leave a part of apical surface 2a of an axial right angle and may cut point 2b aslant, and forming such a notch 3 By accommodation of the coating pressure force, the rest (after) can manufacture the gasket 1 with which are satisfied of  $h/w \geq 1$ . And by forming a notch 3 in point 2b of a needle 2, and making the tip opening configuration of a needle 2 into a variant cross section in this way \*\* Since it is possible to set up the base of the gasket seal 23 comparatively small even if it is the case that the height to partner material (not shown) is comparatively high The location of the gasket seal 23 which can be fabricated can be secured widely, and the degree of freedom of the layout of the gasket seal 23 can be extended. Moreover, as the amount of the molding material of the gasket seal 23 to be used is shown in the graphical representation of \*\* drawing 7 which can be stopped few Since it becomes smaller than the case where the augend of gasket reaction force to the amount of gasket seal crushing is the conventional technique Since it is possible to set up widely the height tolerance of the \*\* gasket seal 23 which can prevent that the gasket substrate 22 deforms according to gasket reaction force, and clearance tolerance with the partner material 24 after crushing The gasket 21 equipped with the cross-section configuration which does so the operation effectiveness which said that the stable seal engine performance was securable, and does such operation effectiveness so can be obtained by once coating of liquefied gasket seal molding material 23'.

[0028] In addition, the notching configuration at needle 2 illustrated tip is an example, and is suitably set up according to the spreading conditions of the configuration and needle 2 bore, and coating pressure force of an aim after the ingredient to apply and spreading.

[0029] Moreover, not only making it move in a parallel direction and the direction of a right angle (X-Y-Z direction) but the fifth [ to the trouble in the above-mentioned conventional technique ] solution means enables rotation actuation of a needle 2 in the direction of theta focusing on the medial axis line O to whole surface 22a of the gasket substrate 22 which is a field for spreading, as show in drawing 8.

[0030] And in this way, if not only make it move in a parallel direction and the direction of a right angle but rotation actuation of a needle 2 be enable focusing on the medial axis line O to whole surface 22a of the gasket substrate 22, it become possible to use effectively the shape of needle dimorphism showed with the above-mentioned fourth solution means, and as the result, it be stabilize and the gasket seal 23 of a variant cross section can be fabricate. That is, in the flat-surface layout of the gasket seal 23, although a cross-section configuration tends to become distorted in the curve and flecion since die length differs on the inner circumference and the periphery of a rubber seal, according to this invention, generating of configuration unevenness can be suppressed rather than the case of the conventional technique, and it can stop that gasket reaction force varies with a location by this.

[0031] Generally, since a dispenser 1 is attached in the Z-axis (namely, theta revolving shaft) through a jig, program amendment of the part which hits the arm is not only needed, but the running torque for weight of a dispenser 1 is needed, and the theta directional-control approach

leads to the increment in a motor or power consumption. Even if the Z-axis is pivotable 360 degrees or more, also when a dispenser 1 interferes in a robot's skeleton depending on the jig at this time, and dispenser 1 configuration and it becomes impossible to be rotated only about 180 degrees, there is. Moreover, when a notch 3 is formed at the tip of a needle 2 and a robot is made into six five axis controls like an industrial robot, a robot's cost will double [ about ] to this invention. As shown in drawing 9 or drawing 10 , carrying out a deer, the rotational structure of a dispenser 1 By considering as the structure of rotating the needle 2 which attached the dispenser body in the Z-axis stay 4, and was attached in the Z-axis 5 \*\* Compaction of the programming time by simplification of an actuation program, and the improvement in accuracy, \*\* The portable weight increase of the part by the reduction in torque (low-capacity-izing) and miniaturization of a Z-axis actuation motor, \*\* the case where the configuration of the dispenser 1 by the ability to use movable angle of rotation of the Z-axis effectively and reduction of constraint of magnitude, and a \*\* 6 shaft robot are used -- comparing -- a robot body -- cost -- about -- the effectiveness referred to as being referred to as one half can be acquired.

[0032] Moreover, you may make it control of each X [ these ], Y and Z, and the direction of theta move both to relativity by moving both, respectively that what is necessary is just to move both to relativity by moving either the table (not shown) which carried the gasket substrate 22 which is a field for spreading or the needles 2.

[0033] In addition, in the example concerned, the viscosity of a gasket sealing material assumes about 500 to 50000 poise. As a gasket sealing material, for example, UV polyurethane, the silicone rubber made from Shin-etsu silicone (RTV rubber), silicone adhesives, etc. are suitable.

[0034] Moreover, in this invention, although shown in drawing 2 (A) or drawing 6 , others and various things can be considered in the cross-section configuration of the gasket seal 23, for example, the following can be mentioned to it.

[0035] \*\* As shown in drawing 11 , let the cross-section configuration of the gasket seal 23 be an abbreviation triangle.

\*\* As shown in drawing 12 , let the cross-section configuration of the gasket seal 23 be an abbreviation square.

\*\* As shown in drawing 13 , let the cross-section configuration of the gasket seal 23 be the abbreviation square which formed the upper limit section in the hemicycle.

\*\* As shown in drawing 14 , make the cross-section configuration of the gasket seal 23 into the abbreviation trapezoid which has arranged the long side in the lower limit section.

\*\* As shown in drawing 15 , make the cross-section configuration of the gasket seal 23 into the abbreviation trapezoid which has arranged the long side in the upper limit section.

\*\* As shown in drawing 16 , make the cross-section configuration of the gasket seal 23 into an abbreviation pentagon.

\*\* As shown in drawing 17 , make the cross-section configuration of the gasket seal 23 into the abbreviation ellipse form which cut the lower limit section flat.

[0036] Although, as for the cross-section configuration of \*\* thru/or \*\*, the maximum width w is set as that lower limit section among the cross-section configurations of this \*\* thru/or \*\*, the maximum width w will be set as parts other than the lower limit section which the cross-section configuration of \*\* thru/or \*\* equipped with the predetermined width of face w1.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** The front view of the needle with which is the important section front view of the dispenser system with which implementation of the manufacture approach of the gasket concerning the first example of this invention is presented, and this system is equipped, and (B) are the direction view enlarged drawings of A in this drawing (A), and (A) is the apical surface enlarged drawing of the above-mentioned needle.

**[Drawing 2]** For (A), (B) is the important section sectional view showing the condition after shaping of the gasket concerning this example, and the important section sectional view showing the condition after crushing of this gasket.

**[Drawing 3]** The graphical representation showing the amount of gasket seal crushing, and the relation of gasket reaction force

**[Drawing 4]** The actuation explanatory view of this dispenser system

**[Drawing 5]** For the important section front view of the needle with which is the important section side elevation of the dispenser system with which implementation of the manufacture approach of the gasket concerning the second example of this invention is presented, and this system is equipped, and (B), the important section side elevation of this needle and (c) are [ (A) ] the bottom view of this needle.

**[Drawing 6]** The important section sectional view showing the condition after shaping of the gasket concerning this example

**[Drawing 7]** The graphical representation showing the amount of gasket seal crushing, and the relation of gasket reaction force

**[Drawing 8]** The actuation explanatory view of this dispenser system

**[Drawing 9]** The sectional view showing an example of the rotational structure of this dispenser system

**[Drawing 10]** The sectional view showing other examples of the rotational structure of this dispenser system

**[Drawing 11]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 12]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 13]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 14]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 15]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 16]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 17]** The important section sectional view of the gasket concerning other examples of this invention

**[Drawing 18]** (A) And important section sectional view of the gasket which (B) requires for the

conventional example, respectively

[Drawing 19] The front view of the needle with which is the important section front view of the dispenser system concerning the conventional example, and this system is equipped, and (B) are the direction view enlarged drawings of B in this drawing (A), and (A) is the apical surface enlarged drawing of the above-mentioned needle.

[Drawing 20] The actuation explanatory view of this dispenser system

[Description of Notations]

1 Dispenser System

2 Needle

2a Apical surface

2b Delivery

2c Point

3 Notch

4 Z-axis Stay

5 Z-axis

21 Gasket

22 Gasket Substrate

22a Whole surface (field for spreading)

23 Gasket Seal

23' Gasket seal molding material

0 Medial-Axis Line

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[Translation done.]

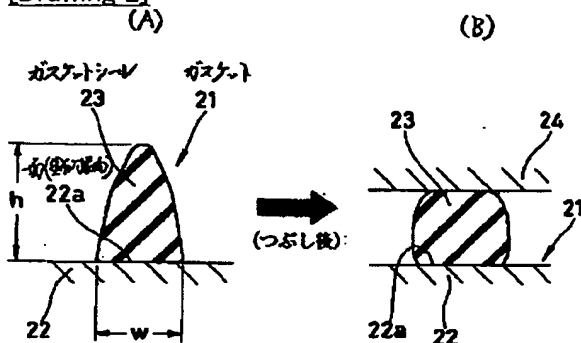
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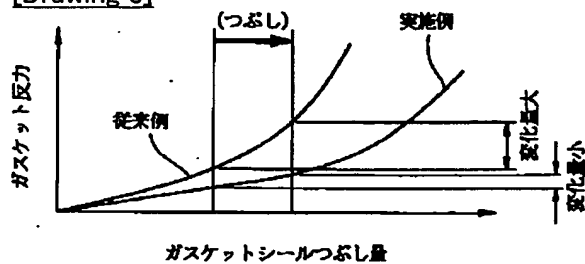
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## DRAWINGS

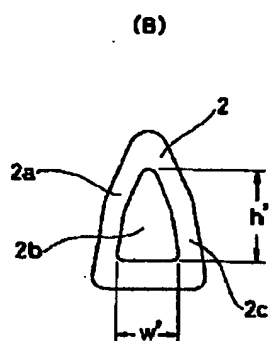
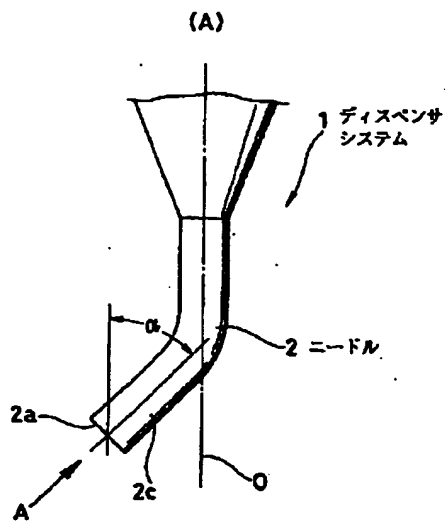
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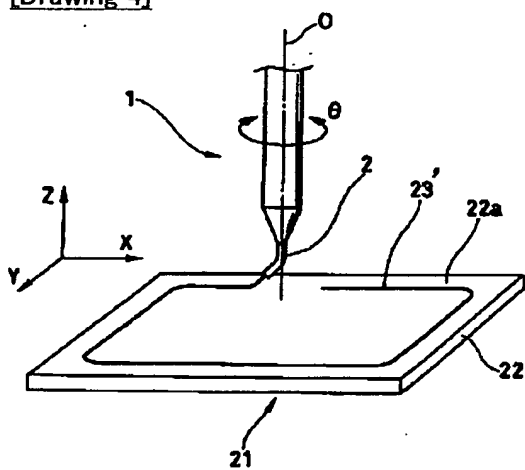
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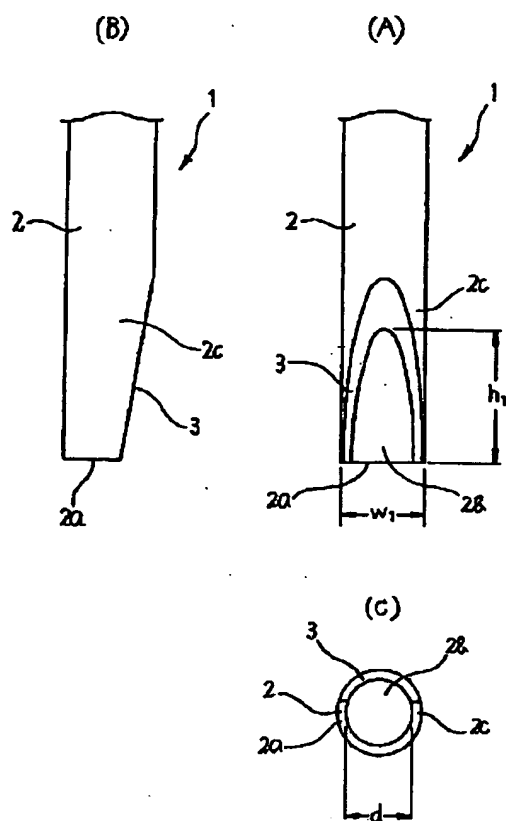
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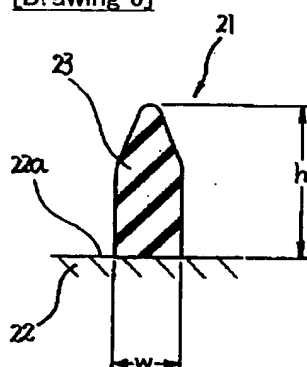
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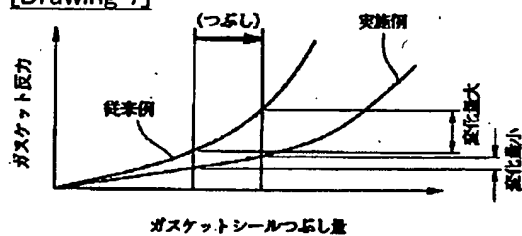
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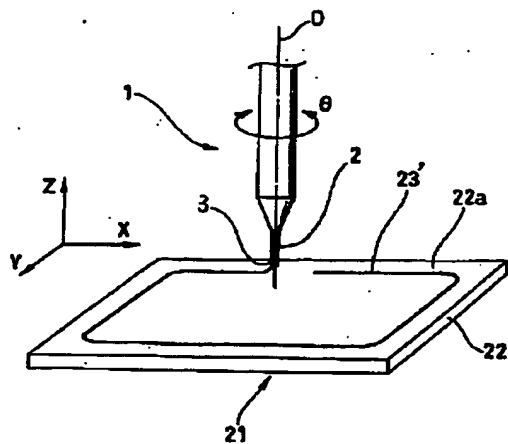
[Drawing 6]



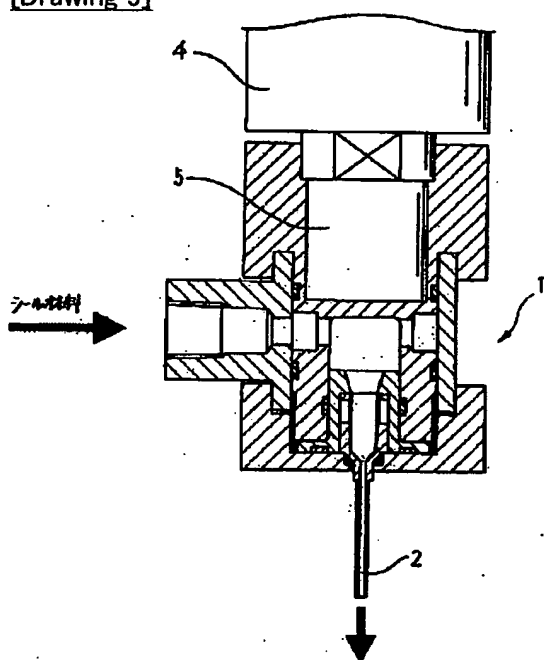
[Drawing 7]



[Drawing 8]

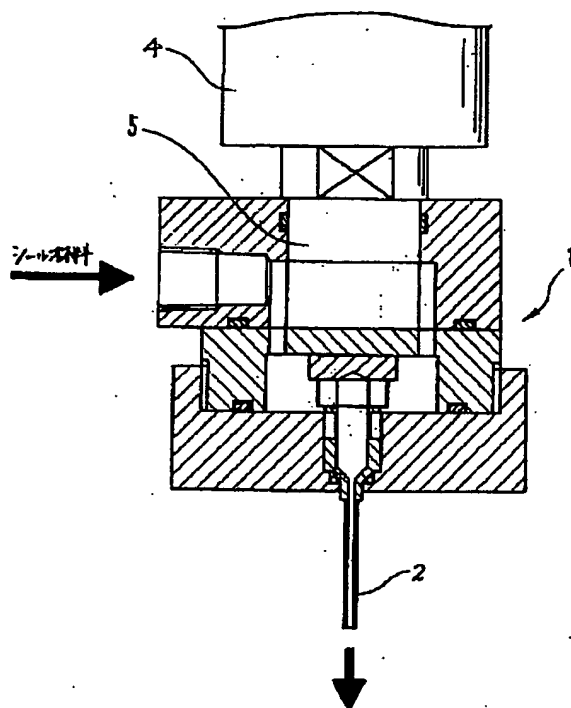


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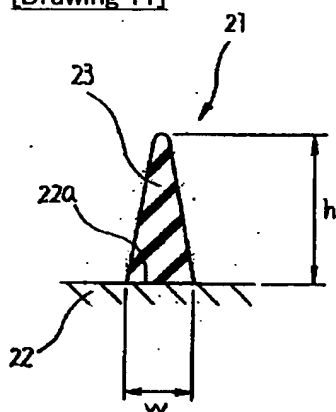


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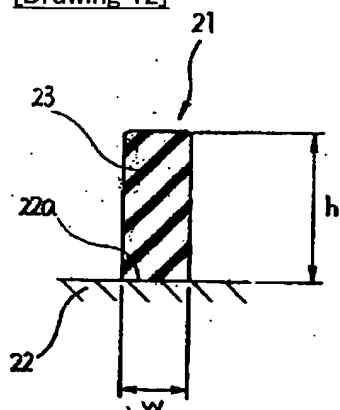




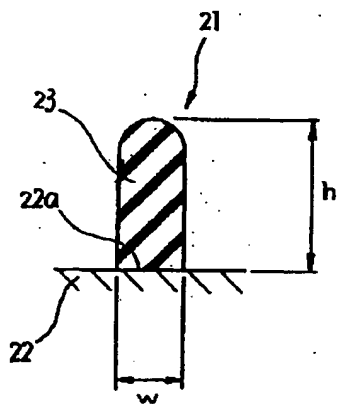
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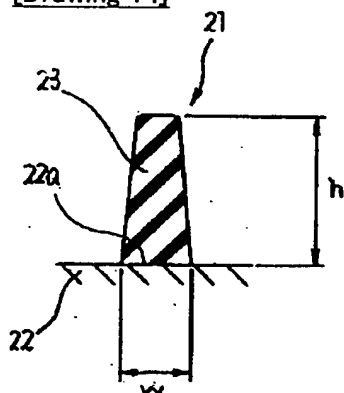
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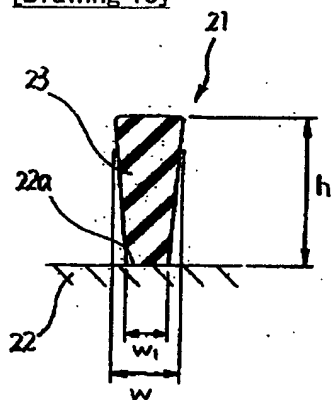
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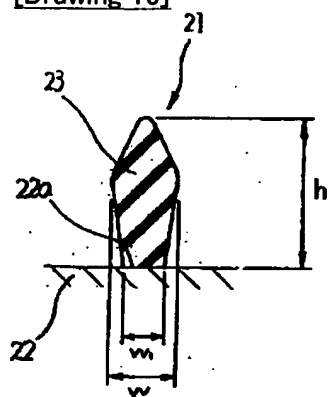
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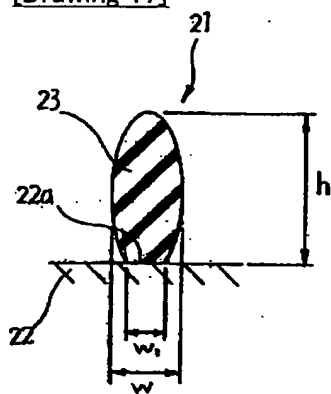
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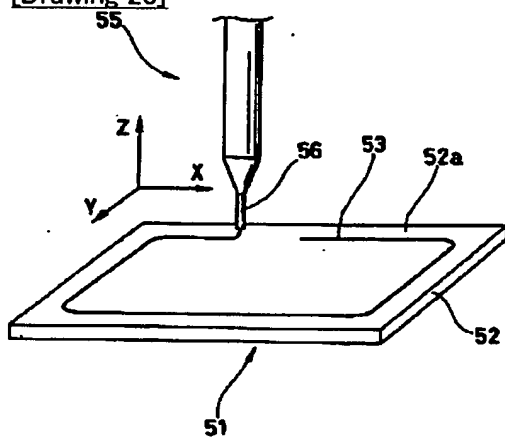
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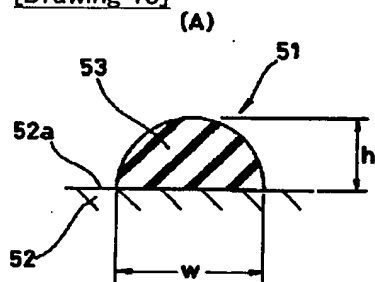
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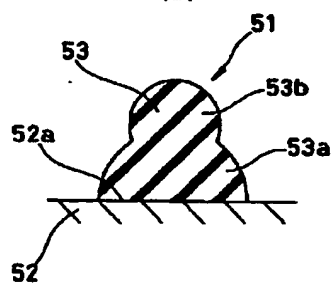
[Drawing 20]



[Drawing 18]

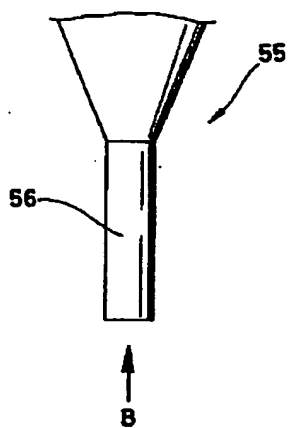


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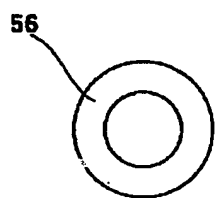


[Drawing 19]

(A)



(B)



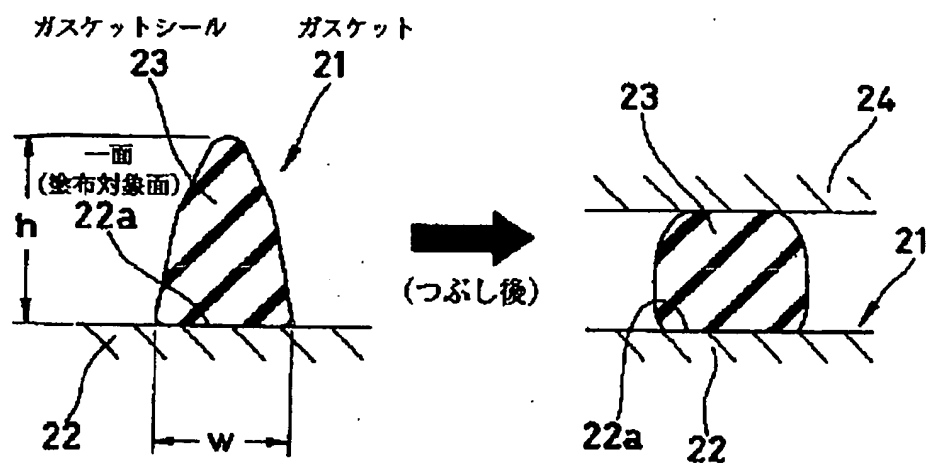
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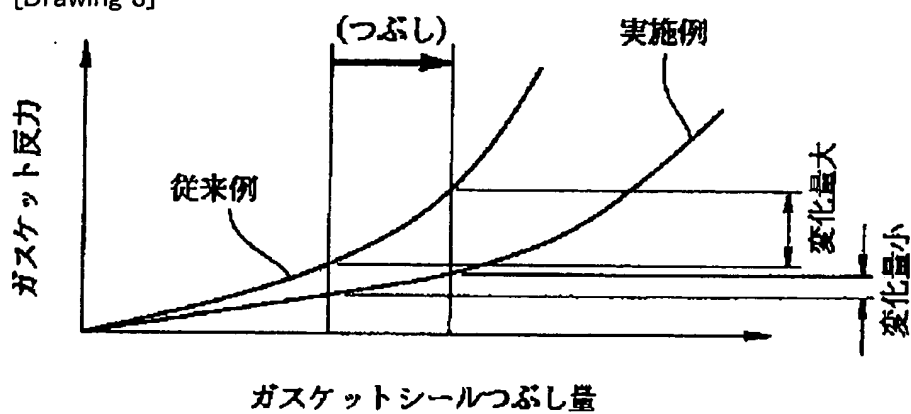


(A)

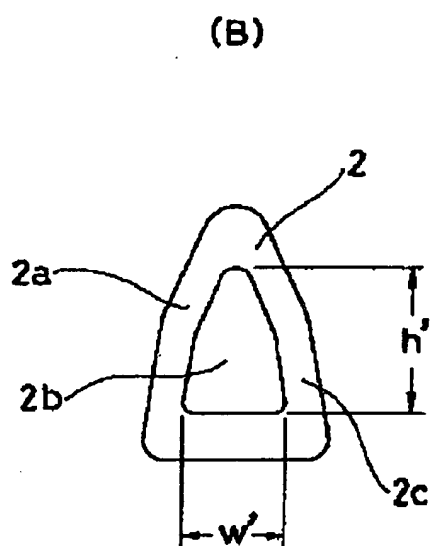
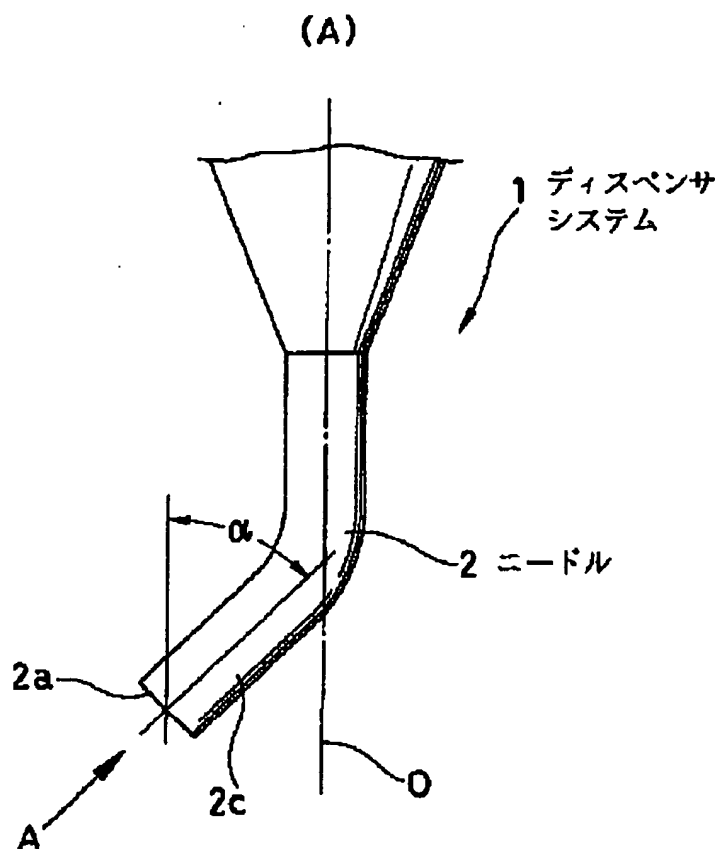
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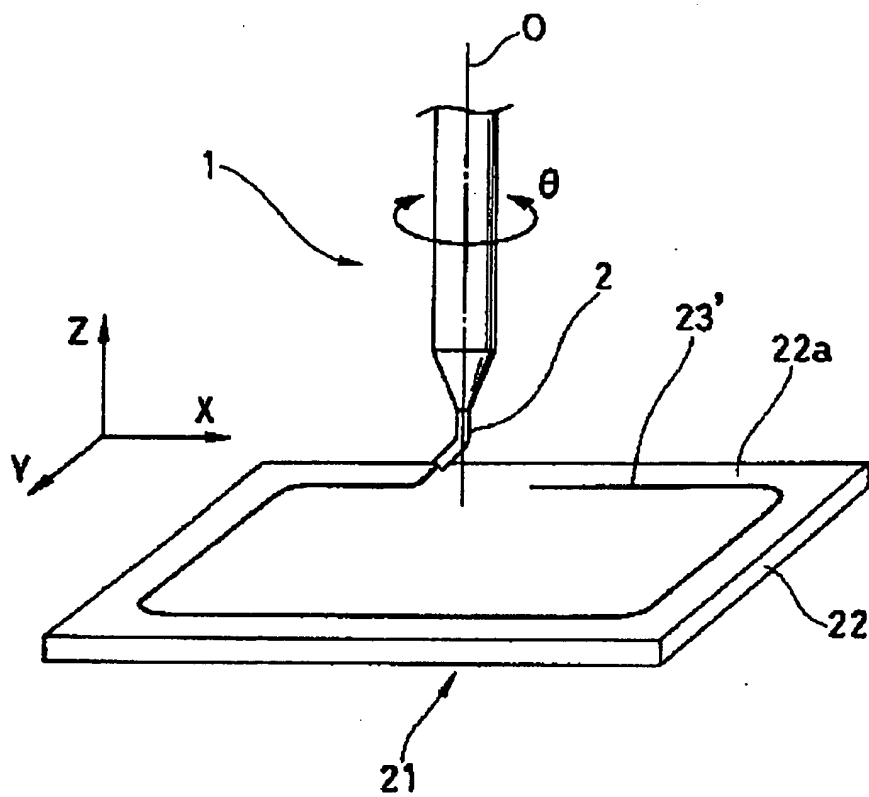
[Drawing 3]



[Drawing 1]

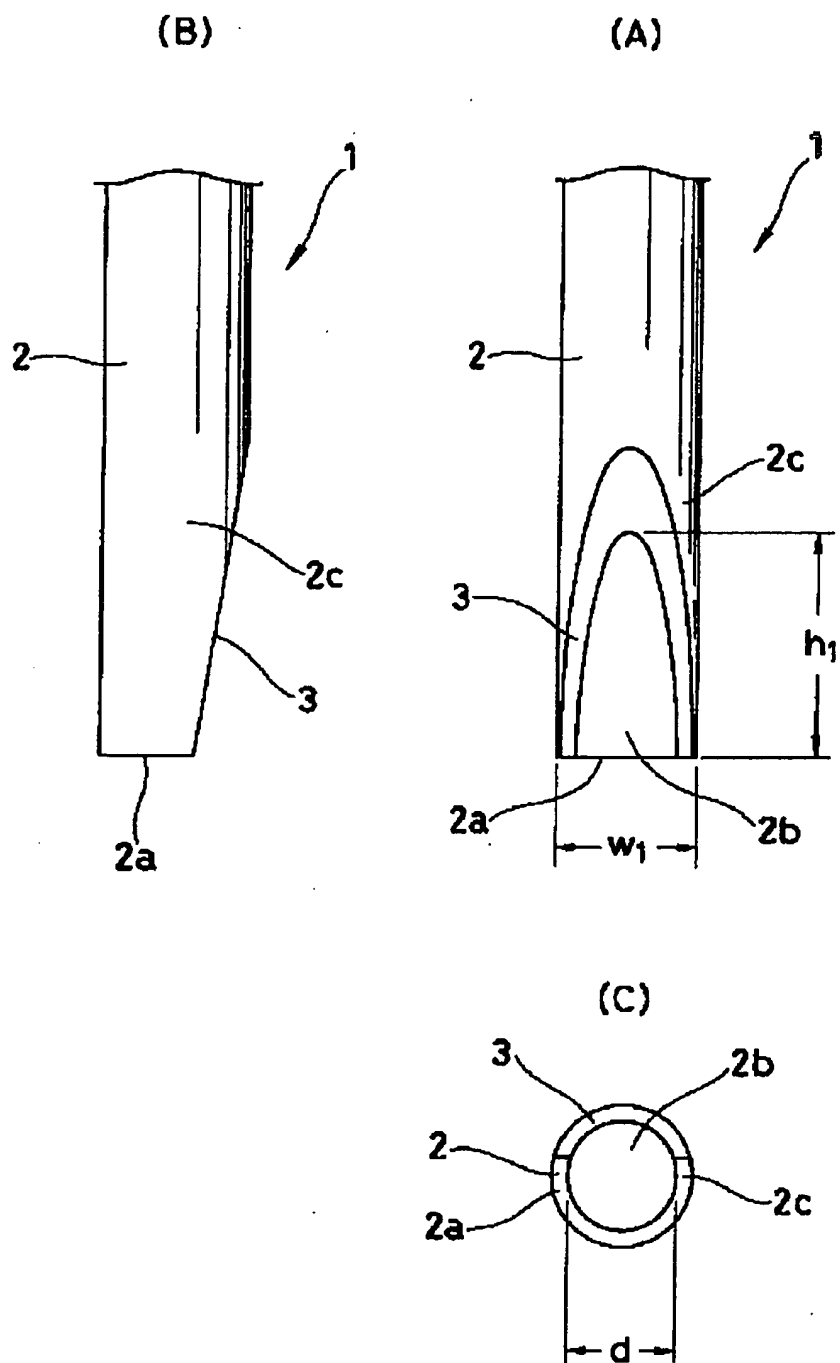


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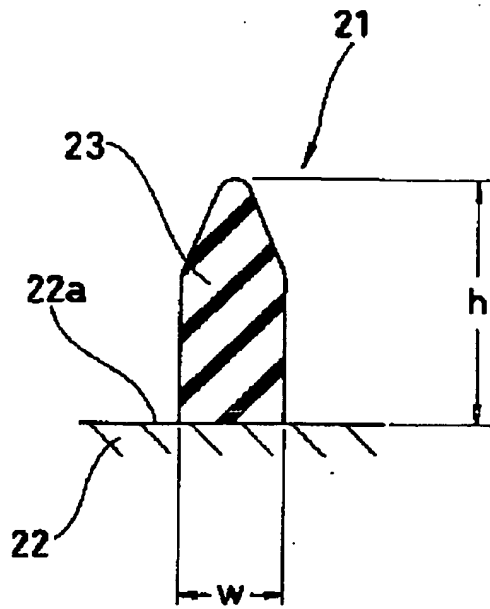


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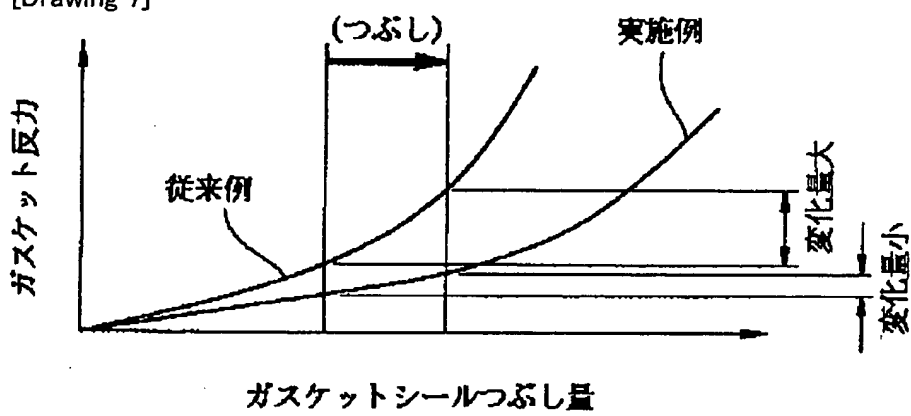




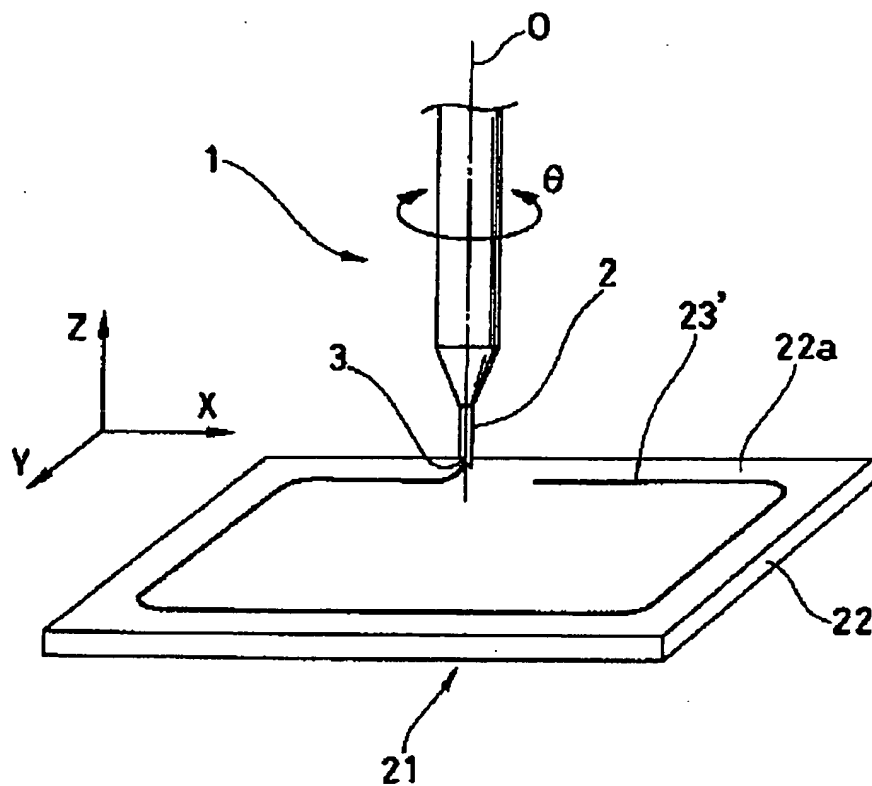
[Drawing 6]



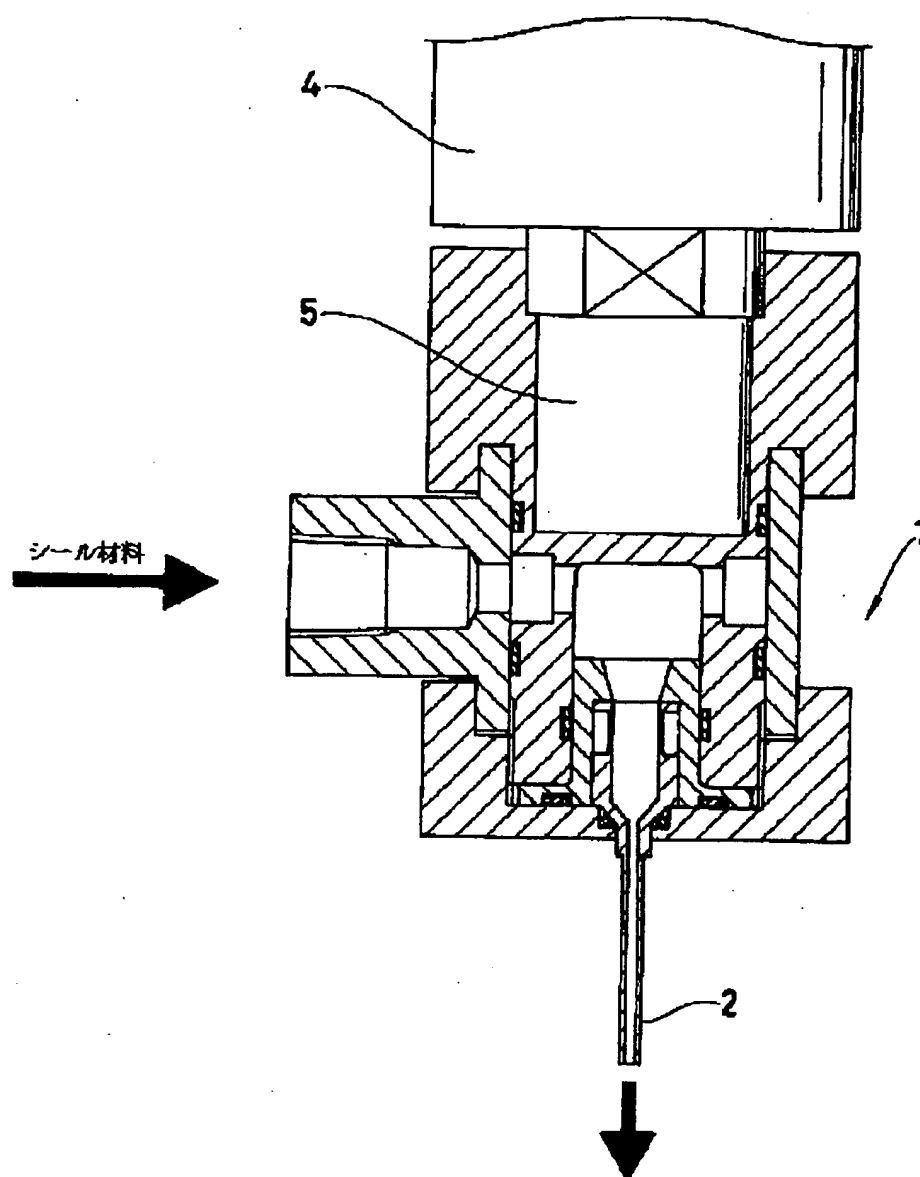
[Drawing 7]



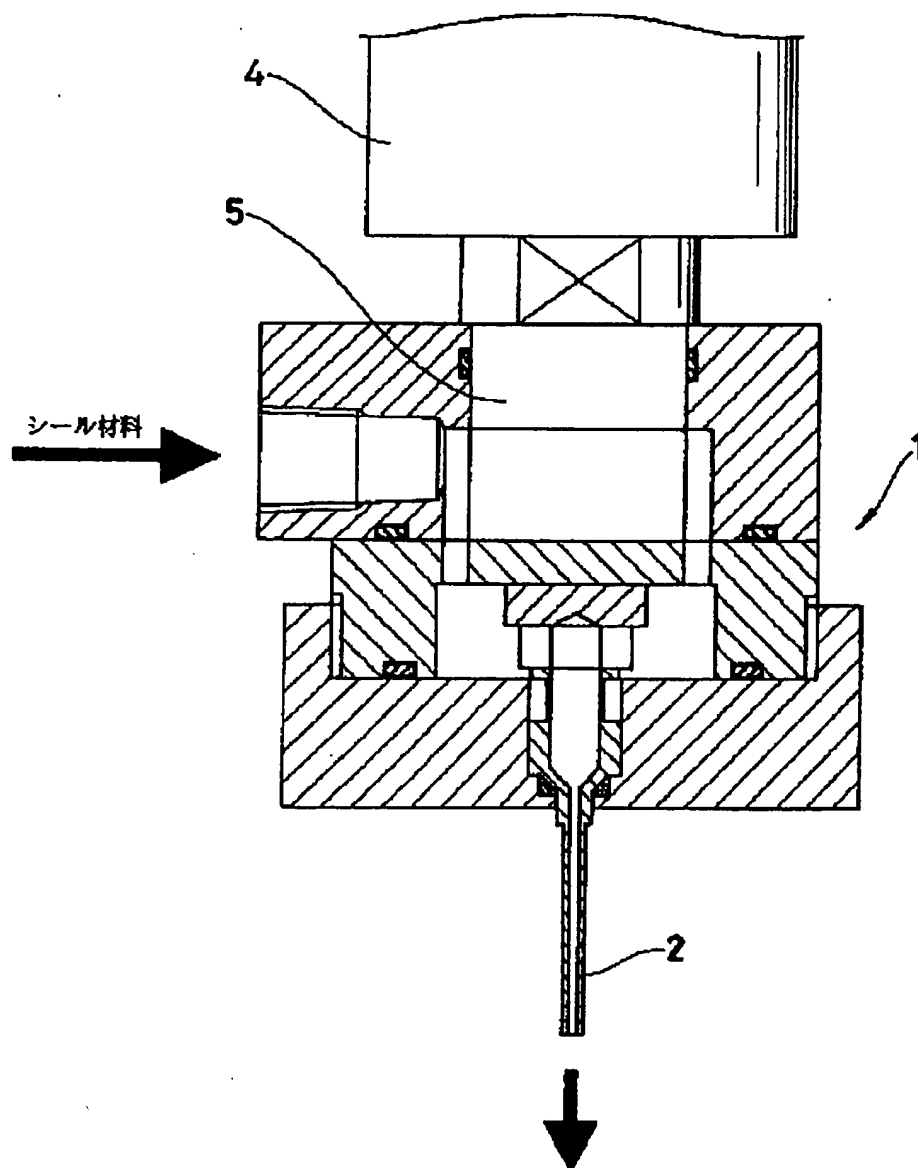
[Drawing 8]



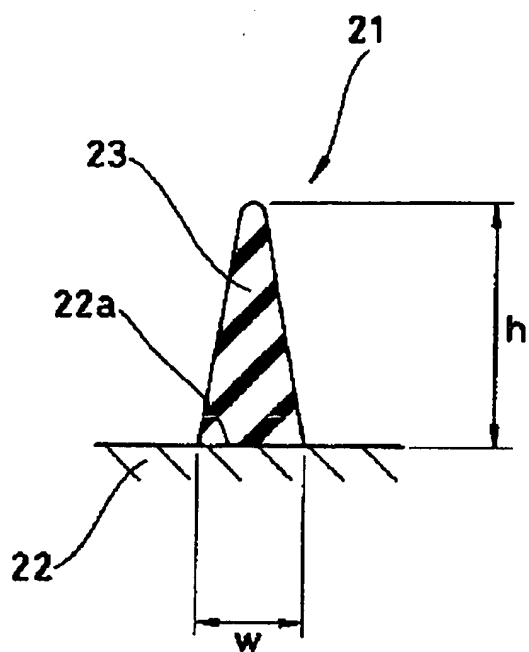
[Drawing 9]



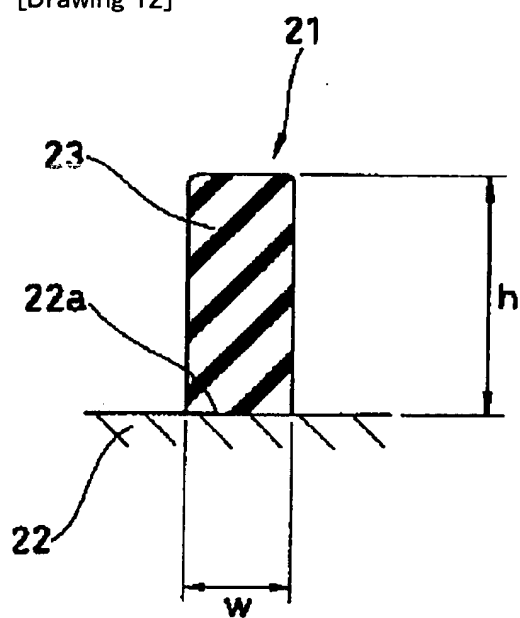
[Drawing 10]



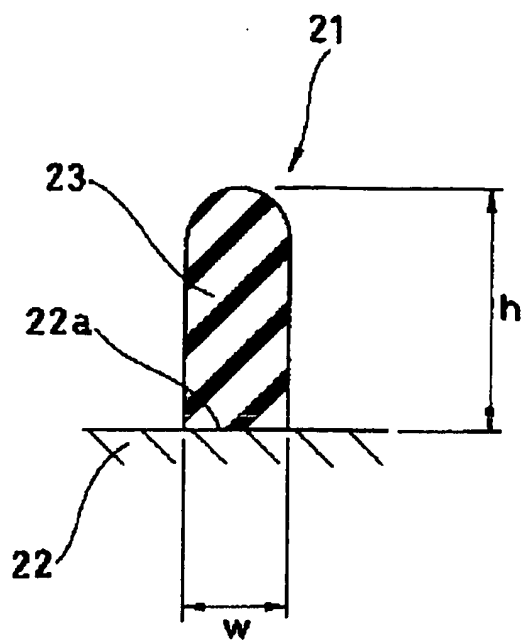
[Drawing 11]



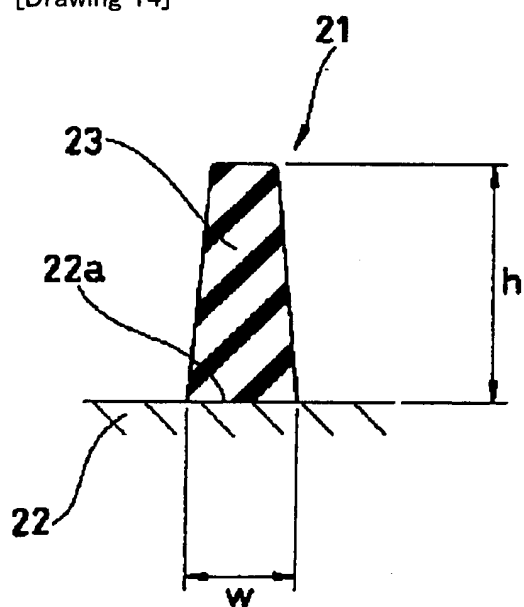
[Drawing 12]



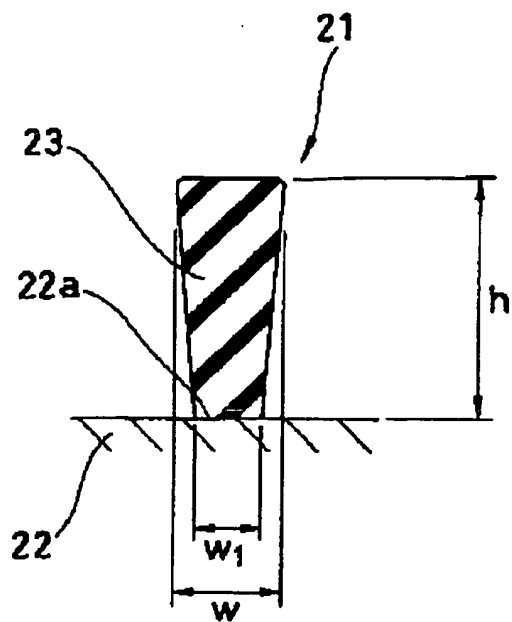
[Drawing 13]



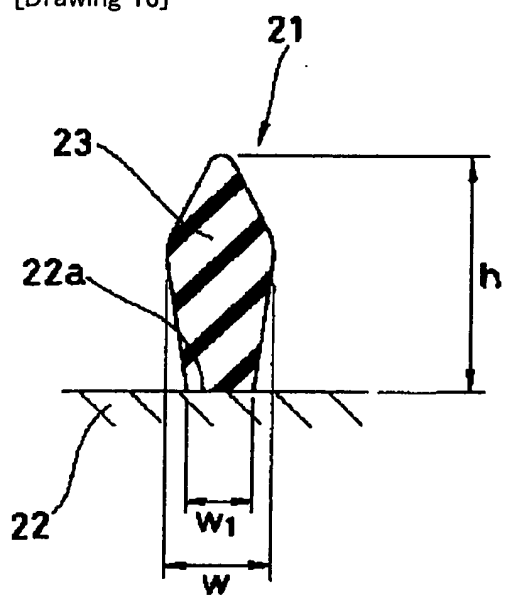
[Drawing 14]



[Drawing 15]

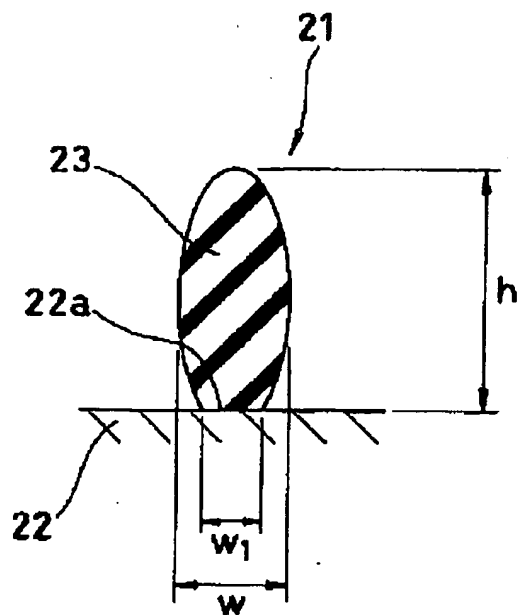


[Drawing 16]

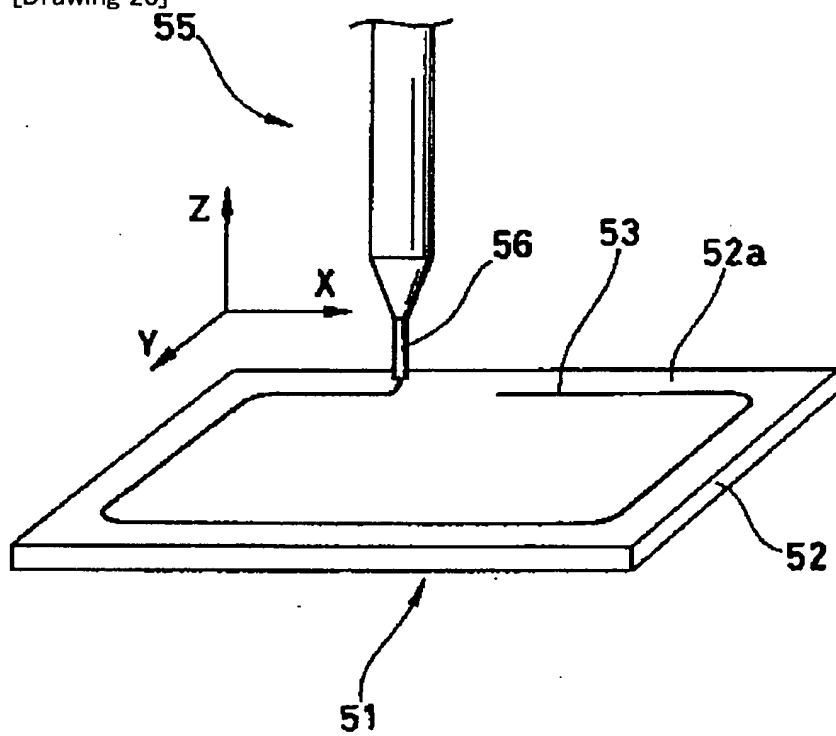


[Drawing 17]

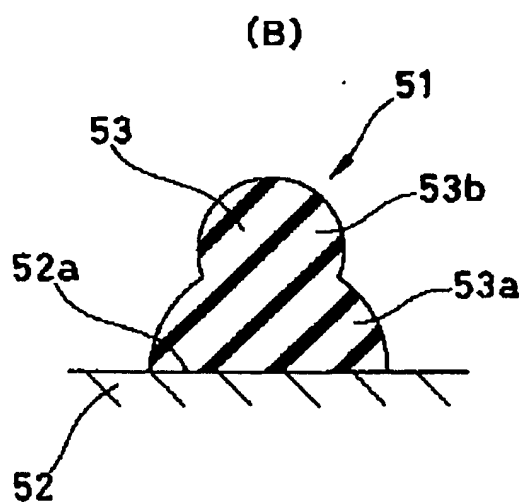
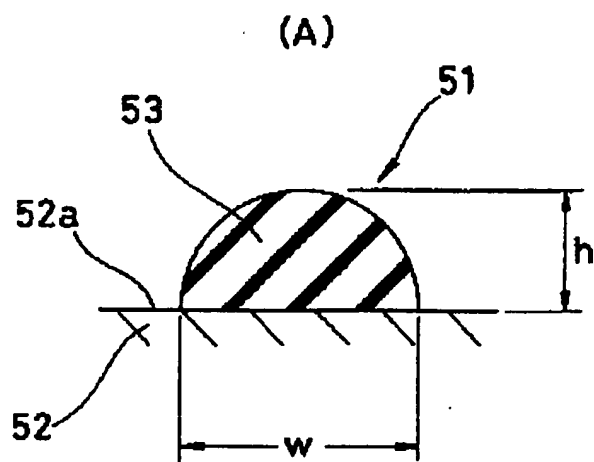




[Drawing 20]

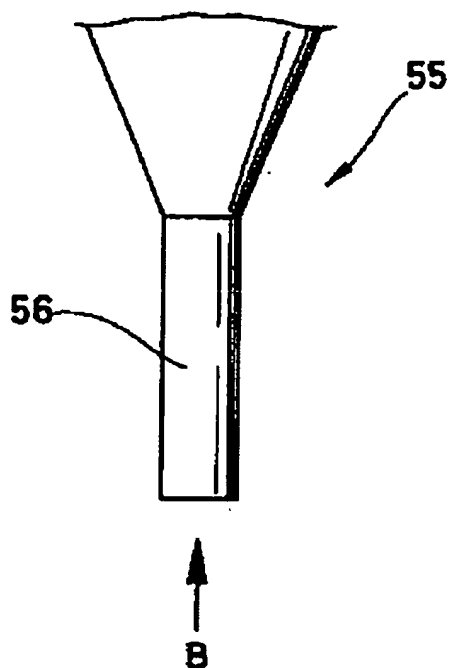


[Drawing 18]

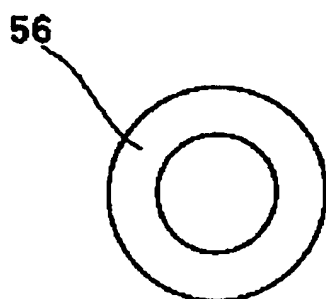


[Drawing 19]

(A)



(B)



[Translation done.]